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X-12806

# SPRINGFIELD ARMORY

RESEARCH AND DEVELOPMENT



## MEMORANDUM REPORT

PROJECT TITLE AMMUNITION, CALIBER .30  
FOR LIGHT WEIGHT WEAPONS

PROJECT NO. TS 1 - 2

REPORT TITLE ROUND-ROBIN COMPARISON  
TEST OF LIGHT RIFLE AMMUNITION CALIBER .30

SPRINGFIELD, MASSACHUSETTS

ITEM. 30 AM. DATE 8 DEC 1948 SA-MR20-2103

Springfield Armory

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SPRINGFIELD ARMORY

RESEARCH AND DEVELOPMENT DIVISION

MEMORANDUM REPORT SA-MR20-2103

L. O. Spaulding/shp/632

8 December 1948

SUBJECT:

Round-Robin Comparison Test of Light Rifle Ammunition Caliber .30

OBJECT:

To obtain a record of the pressure and velocity of the subject ammunition to be used to determine the testing level of this station.

SUMMARY:

Ten rounds each of the subject ammunition were fired for velocity and pressure. Average chamber pressure was 33,795 p.s.i., average port pressure was 17,020 p.s.i. and the average of individual velocities was 2534 f.s. Detailed information is shown on Tables I and II.

REFERENCE:

F.A. 474/552  
S.A. 471.4<sup>3</sup>/24

MATERIAL:

1. Duplex Pressure Gage, Serial Number 3330172. Mann barrel 22 inches long. Rifling one turn in twelve inches. Originally chambered according to drawing SPOTS 150 and later reamed to accommodate the modified light rifle cartridge T65E1. Chamber pressure opening .925 inches from rear of barrel and port pressure opening 12.445 inches from rear of barrel. Head-space 1.5485 inches.

2. Light Rifle, Caliber .30 Model T-28 Number 10 for velocities.

3. Counter Chronograph in conjunction with lumiline screens manufactured by "CODE P0". Instrumental velocity at 53 feet.

4. Barograph manufactured by "CODE FD"

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5. Thermograph manufactured by "CODE FD".
6. Light Rifle Ammunition, Caliber .30 T65E1 submitted for test by Frankford Arsenal. (no lot number given)
7. Coppers for obtaining chamber pressures  
Mean length uncompressed .4002  
Mean diameter uncompressed .2264  
For use with 1/30 square inch diameter piston.  
Frankford Arsenal Drawing No. F.D. 12963 dated 12/11/43  
S. O. 462 Lot 3  
E. D. Memo 112 F. Y. 43
8. Coppers for obtaining port pressures  
Mean length uncompressed .4001  
Mean diameter uncompressed .1462  
For use with 1/30 square inch diameter piston.  
Frankford Arsenal Drawing No. F.D. 12977 dated 12/29/43  
S. O. 583 Lot 1A  
E. D. Memo 112 F. Y. 43

DATE OF TEST:

30 November 1948.

PROCEDURE:

Ten rounds of the subject ammunition were fired in a duplex gage for chamber and port pressures.

As an M2 Universal Receiver was not available, ten single round velocities (I.V. at 53 ft.) were obtained with the use of a Lightweight Rifle, Caliber .30, T-28 having a comparatively new barrel and 1.5485 headspace.

Method of conducting test was done in accordance with procedure outlined in ORD-M608-PM Section 7-13.

The firing of reference rounds immediately after firing the test rounds was omitted due to unavailability of reference rounds of this type ammunition.

RESULTS:

The average chamber pressure for ten rounds was 13795 pounds per square inch.

The average port pressure for ten rounds was 17020 pounds per square inch.

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Average check velocity at 53 feet taken with pressures for nine rounds (one round, no record) was 2427 feet per second.

Average velocity for ten rounds at 53 feet taken with the Lightweight Rifle Caliber .30, T28 was 2534 feet per second.

Detailed pressure and velocity information is shown on Tables I and II.

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## TABLE I

### CHAMBER AND PORT PRESSURE CHECK ON LIGHT RIFLE AMMUNITION SUBMITTED BY FRANKFORD ARSENAL

CHAMBER PRESSURE LBS. PER SQ. IN.	PORT PRESSURE LBS. PER SQ. IN.	CHECK VELOCITY FT. PER SEC. AT 53 FT.
33950	16500	2419
33900	16500	2431
33600	16800	
35100+	16500	2432
33150	17900	2436
33200	17300	2418
33950	16500-	2410-
34550	16900	2436
33950	17400	2426
32600-	17900+	2438+
Mean 33795	Mean 17020	Mean 2427
Max. 35100	Max. 17900	Max. 2438
Min. 32600	Min. 16500	Min. 2410
Ex. Var. 2500	Ex. Var. 1400	Ex. Var. 28
S.D. 678	S. D. 540	S.D. 15.7

Firing room temperature 74° F.  
Barometer 30.1 inches  
Duplex Pressure Gage #3330172  
Counter chronograph and lumiline screens



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## TABLE II

### INSTRUMENTAL VELOCITY AT 53 FEET OF LIGHT RIFLE AMMUNITION SUPPLIED BY FRANKFORD ARSENAL

#### VELOCITY AT 53 FEET FT PER SECOND

2539  
2469-  
2578+  
2545  
2520  
2511  
2514  
2534  
2568  
2562

Mean	2534
Max.	2578
Min.	2469
Ex. Var.	109
S.D.	30.6

Firing room temperature 74° F.  
Barometer 30.1 inches  
Counter chronograph and lumiline screens  
Lightweight Rifle Caliber .30, T28, #10